

CLAIMS

1. A method for manufacturing injection-molded articles out of thermoplastics, comprised of

- a) a step for plasticizing the plastic via a multi-screw extruder,
- b) a step for press-molding the plasticized plastic into at least one mold,

characterized in that the plastic is plasticized in a continuous multi-screw extruder having at least three screw shanks that tightly intermesh at least in partial areas and are situated on a collar line, in particular an annular extruder having at least six screw shanks that tightly intermesh at least in partial areas and are arranged in a collar, and that the plasticizing extruder (11; 31) has a throughput characteristic Z greater than 800, in particular greater than 2750, wherein $Z = Q/L^{2.8}$ is computed with the throughput Q in [kg/h] and the length L in [m].

2. The method according to claim 1, characterized in that the thermoplastic is a polycondensate, in particular a polyester.
3. The method according to one of the preceding claims, characterized in that the polycondensate is dried before plasticized.
4. The method according to one of the preceding claims, characterized in that the quantity of plasticized plastic measures more than 800 kg/h, in particular more than 1000 kg/h.
5. The method according to one of the preceding claims, characterized in that the plasticized plastic passes through one or more of the following steps:
 - a) degassing;
 - b) mixing with additives;
 - c) filtering;
 - d) increasing of pressure via a melt pump;

- e) determining of rheological properties;
 - f) buffering in at least one buffer container, so that plasticizing can be continuous, and press-molding in a mold can take place discontinuously.
6. The method according to one of the preceding claims, characterized in that the plasticized plastic, is fed alternatively to one of at least two buffer containers by way of a control valve, and either:
- a) is press-molded in an injection molding tool allocated to the respective buffer container;, or
 - b) is press-molded in a single injection molding tool via an additional control valve.
7. The method according to one of the preceding claims, characterized in that the average retention time of the plasticized plastic in the process does not exceed 60 seconds plus the cycle time, in particular 30 seconds plus the cycle time, and/or the average retention time of the plasticized plastic is not to exceed 15 seconds in the processing section of the plasticizing extruder, in particular not to exceed 10 seconds.
8. The method according to one of the preceding claims, characterized in that the plasticized plastic is press-molded in numerous cavities of an injection molding tool in order to manufacture a plurality of hollow items, in particular parisons from food packagings like beverage bottles, out of a thermoplastic, e.g., a polyester.
9. A system for manufacturing injection-molded articles out of thermoplastics, which consists at least of a multi-screw extruder as the plasticizing extruder (11; 31) and at least one injection-molding tool (21; 44, 46), characterized in that the plasticizing extruder is a continuous multi-screw extruder with at least three screw shanks that tightly intermesh in at least partial areas and are situated on a collar line (16_{n1}-16_{nx}; 36_{n1}-36_{nx}), and that the plasticizing extruder

(11; 31) has a throughput characteristic Z exceeding 800, in particular exceeding 2750, wherein $Z = Q/L^{2.8}$ is computed with the throughput Q in [kg/h] and the length L in [m].

10. The system according to claim 9, characterized in that the multi-screw extruder (11; 31) is an annular extruder with self-contained screw shanks arranged in a collar.
11. The system according to claim 9 or 10, characterized in that the plasticizing extruder (11; 31) has at least one drive (12); a reduction gear (13), a power divider (14) and a process section (15), wherein the process section consist of one or more of the following components:
 - a) one or more material inlet holes;
 - b) one or more metering devices connected with a material inlet hole;
 - c) one or more outlet holes;
 - d) one or more vacuum stations connected with an outlet hole;

and a melt path is arranged between the plasticizing extruder (11; 31) at the at least one injection molding tool (21; 44, 46), wherein the melt path can have one or more of the following components:

- e) a melt pump;
 - f) one or more measuring devices for acquiring rheological data;
 - g) one or more melt filters;
 - h) one or more buffer containers;
 - i) one or more control valves.
12. The system according to one of claims 9 to 11, characterized in that the melt path has at least one control valve (39n1) and at least two buffer containers (40, 42), wherein the control valve establishes a respective connection between the plasticizing extruder (31) and a buffer container (40, 42), and either

- a) a respective buffer container is connected with an allocated injection molding tool (44, 46), or
 - b) the at least two buffer containers are connected with a single injection molding tool by way of an additional control valve.
13. The system according to one of claims 9 to 12, characterized in that the screw shafts (16n1-16nx; 36n1-36nx) are axially shiftable, thereby creating a buffer area in the process section during an axial shift toward the back, wherein either
- a) the screw shanks shift axially relative to the power divider (14); or
 - b) the screw shanks shift axially along with the power divider (14) relative to the reduction gear (13); or
 - c) the screw shanks shift axially along with the power divider (14) and the reduction gear (13) relative to the drive (12); or
 - d) the screw shanks shift axially along with the power divider (14), the reduction gear (13) and the drive (12); or
 - e) the casing of the process section shifts axially relative to the screw shanks; or
 - f) the core inside the screw shank collar of an annular extruder can be axially shifted relative to the screw shanks.
14. The system according to one of claims 9 to 13, characterized in that the injection-molding tool (21; 44, 46) has several cavities (22_{n1}-22_{nx}; 45_{n1}-45_{nx}, 47_{n1}-47_{nx}) to manufacture parisons of foodstuff packagings, in particular beverage bottles.